

# Work Order ID 74976

**\*74976\***

Page 1

October 14, 2011 8:42:08 AM

Item ID: D212-664-107

Accept

**\*N900040100\***

Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Low Standard Fwd

Start Date: 10/14/11 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 10/28/11 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: MLJ Date: 11/10/14 Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
<b>Draw Nbr</b>	<b>Revision Nbr</b>								
D212-664-147	Rev B (DEO)								

100

0.00

**\*100\***

DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D212-664-107 CHG002

110

0.00

**\*110\***

Packaging

Packaging

Memo

0.00

Packaging

120

0.00

**\*120\***

BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D212-664-107 using CNC bender program 212-107

*Handwritten: S. L. L. S.*

*Handwritten: Cor MLJ 11-11-14*

*Handwritten: JW*

*Handwritten: 11/10/17*

*Handwritten: JW/MO*

*Handwritten: 11/10/17*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

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Setup Start **\*NS1\***

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Item Name: Crosstube Low Standard Fwd

Stop **\*NS2\***

Start Date: 10/14/11 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 10/28/11 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

130

QC15- Crosstube Dimensional Check

0.00

**\*130\***

QC

Memo

0.00

Quality Control

140

Crosstubes

0.00

**\*140\***

Crosstubes

Memo

0.00

Crosstubes

1-Cut tube as per inspection dwg and deburr ends. \*\*\*ensure saw is square\*\*\*

2-Position cuffs on tube ensure proper positioning

3-Drill tube as per dwg using DT8577 location #7 & # 212 ULF using jig DT8548 and DT8549 as per QSI 10

4-Transfer drill rivet holes from cuff into tube.

5-Identify cuff position and Batch # on each and identify tube as per dwg D212-664-107.

6- Inspect surface damage

7- Deburr and realodine cuff.

JW

11-10-19

RT 11-10-20

JW

11-10-24

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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## Quality Control

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Stop **\*NS2\***

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Start Date: 10/14/11 Start Qty: 1.00

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Cust Item ID:

Required Date: 10/28/11 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180	Outsource process - NDT per QSI038 4.1	0.00							
<b>*180*</b>									
Outsource2	Memo	0.00							
Outsource process - NDT	Liquid Penetrant Inspection as per QSI 038Or Issue P/O: <u>15287</u> LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order								<u>CL 11/10/28</u> (D)
190		0.00							
<b>*190*</b>									
Packaging	Packaging								
Packaging	Memo	0.00							<u>11/14/28</u> (U)
Packaging	Ensure copy of NDT results attached to work order.								
200	QC5- Inspect part completeness to step on W/O	0.00							
<b>*200*</b>									
QC	Memo	0.00							<u>25 11-10-28</u>
Quality Control	Inspect for damage & ensure results are as per Dwg D212-664-107								

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Low Standard Fwd

Start Date: 10/14/11 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 10/28/11 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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210

0.00

**\*210\***

Crosstubes

Crosstubes

Memo

0.00

1-Rivet Cuffs as per Dwg D212-664-147. with Sika flex in Between tube & Cuff  
A/R SIKAFLEX -241/-291 BATCH: 11939985 11-10-31

220

0.00

**\*220\***

SprayPaint

SprayPaint

Memo

0.00

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

PRIME:

Start Time: 1040Finish Time: 1100

PAINT:

Start Time: 700Finish Time: 40085 11-10-31

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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**\*74976\***

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Item ID: D212-664-107

Accept

**\*N900040100\***

Setup Start

**\*NS1\***

Revision ID:

Stop

**\*NS2\***

Item Name: Crosstube Low Standard Fwd

Start Date: 10/14/11 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 10/28/11 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start

**\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

**\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
230	QC14- Inspect Spray Paint	0.00							
<b>*230*</b>									
QC	Memo	0.00							
Quality Control	Wrap in plastic bag to protect from scratches								
240		0.00							
<b>*240*</b>									
Crosstubes	Memo	0.00							
Crosstubes	1- Assemble as per Dwg D212-664-147								
	1-Abrade mating surfaces of support and crosstube with 400 grit sandpaper, clean the area with 4105S wash 'n' wipe								
	2-Install supports with Proseal 890 per DSI9563 and QSI 015 A/R Proseal 890 Batch: <u>119396</u>								
	3- Torque bolts as per dwg								

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries

**\*74976\***

October 14, 2011 8:42:08 AM

**\*N900040100\***

Setup Start \*NS1\*

Stop \*NS2\*

**Start Date:** 10/14/11      **Start Qty:** 1.00      **\*1\***

**Required Date:** 10/28/11      **Req'd Qty:** 1.00      **\* 1 \***

**Reference:**

Run Start \*NR1\*

Stop \*NR2\*

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

250	QC5- Inspect part completeness to step on W/O	0.00	
-----	---	------	--

0.00

## Quality Control

0.00

0.00

## Packaging

0.00

0.00

## Quality Control

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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**\*74976\***

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October 14, 2011 8:42:08 AM

Item ID: D212-664-107 Accept **\*N900040100\*** Setup Start **\*NS1\***  
Revision ID: Stop **\*NS2\***  
Item Name: Crosstube Low Standard Fwd  
Start Date: 10/14/11 Start Qty: 1.00 **\*1\*** Cust Item ID:  
Required Date: 10/28/11 Req'd Qty: 1.00 **\*1\*** Customer:  
Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_ Run Start **\*NR1\***  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_ Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
270	Packaging	0.00				11/4/15			
<b>*270*</b>									
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPP D212-664-107								
280	QC21- Final Inspection - Work Order Release	0.00							
<b>*280*</b>									
QC	Memo	0.00							
Quality Control									

Reoc

11/11/17  
mf  
11-11-16

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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# Picklist Print

October 14, 2011 8:42:13 AM

Page 1

Work Order ID: 74976

**\*74976\***

Parent Item: D212-664-107

**\*D212-664-107\***

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 10/14/11

Required Date: 10/28/11

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A New Issue 07.09.12 EC verified by: JLM  
 IPP Rev:B ECN 1100 08-01-11 DD verified by: EC  
 IPP Rev:C Ecn 1121 08-02-25 DD Verified by:ec IPP Rev:D  
 10.05.27 added pick kit DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D212-664-107TRN		Manufactured	No	B74250		140	Each	1.0000	1	1		JW 11-10-17	
<b>*D212-664-107TRN*</b>									**				
Crosstube Turning Detail													

D3659-1		Manufactured	No			220	Each	5.0000	2	2			
<b>*D3659-1*</b>									**			RT 11-10-19	
CUFF													

				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				LG		1							
				67429		1							
D3659-1		Manufactured	No			220	Each	5.0000	2	2			
<b>*D3659-1*</b>									**			RT 11-10-19	
CUFF													
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				ST477		3							
				67005		3							
				ST482		2							
				71868		2							
CR3212-4-06		Purchased	No			240	Each	774.0000	44	44			
<b>*CR3212-4-06*</b>									**			RT 11-10-31	
CHERRY RIVET													
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				ST311		774							
				112492		18							
				112794		756							

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Work Order ID: 74976

**\*74976\***

Parent Item: D212-664-107

**\*D212-664-107\***

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 10/14/11

Required Date: 10/28/11

Start Qty: 1.00

Required Qty: 1.00

D3595-063-450

Manufactured No

240

Each

137.5600

4

4

**\*D3595-063-450\***

RUBBER CUSHION

\*\*

W 11.11.10

Location

Loc Qty

Loc Code

LG

107.76

67353

3

68893

6

70113

0.56

71354

0.2

74113

98

LG055

29.8

72967

29.8

MS21920-25

Purchased No

240

Each

104.0000

4

4

**\*MS21920-25\***

Clamp(per MIL-DTL-8783C)

\*\*

W 11.11.10

Location

Loc Qty

Loc Code

LG

48

113281

0

113282

0

118142

4

118183

44

LG050

56

116264

2

117998

4

119227

50

D2893-1

Manufactured No

240

Each

20.0000

2

2

**\*D2893-1\***

2.75 Support

\*\*

W 11.11.10

Location

Loc Qty

Loc Code

LG052

20

72586

2

72865

18

B# 119339

B# 74768

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Parent Item Name: Crosstube Low Standard Fwd

Start Date: 10/14/11

Required Date: 10/28/11

Start Qty: 1.00

Required Qty: 1.00

D3428-1

Manufactured No

260

Each

25.0000

**\*D3428-1\***

Placard

\*\*

Location

Loc Qty

Loc Code

ST053

25

72048

5

73498

20

Purchased

No

260

Each

64.0000

AN6-35A

**\*AN6-35A\***

BOLT

\*\*

Location

Loc Qty

Loc Code

ST343

64

118422

34

118838

30

Purchased

No

260

Each

65.0000

AN6-36A

**\*AN6-36A\***

Bolt

\*\*

Location

Loc Qty

Loc Code

ST343

65

118012

1

118422

34

118838

30

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Parent Item Name: Crosstube Low Standard Fwd

Start Date: 10/14/11

Required Date: 10/28/11

Start Qty: 1.00

Required Qty: 1.00

MS21042L6

Purchased

No

260

Each

1,792.000

6

6

\*\*

**\*MS21042I 6\***

Nut

Location

Loc Qty

Loc Code

ST300

792

117677

136

118384

8

118927

48

118968

600

ST518

1000

119075

1000

AN960JD616

NAS1149D0663J Purchased

No

260

Each

0.0000

18

18

\*\*

**\*AN960.ID616\***

Washer

1119075 Shulley

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

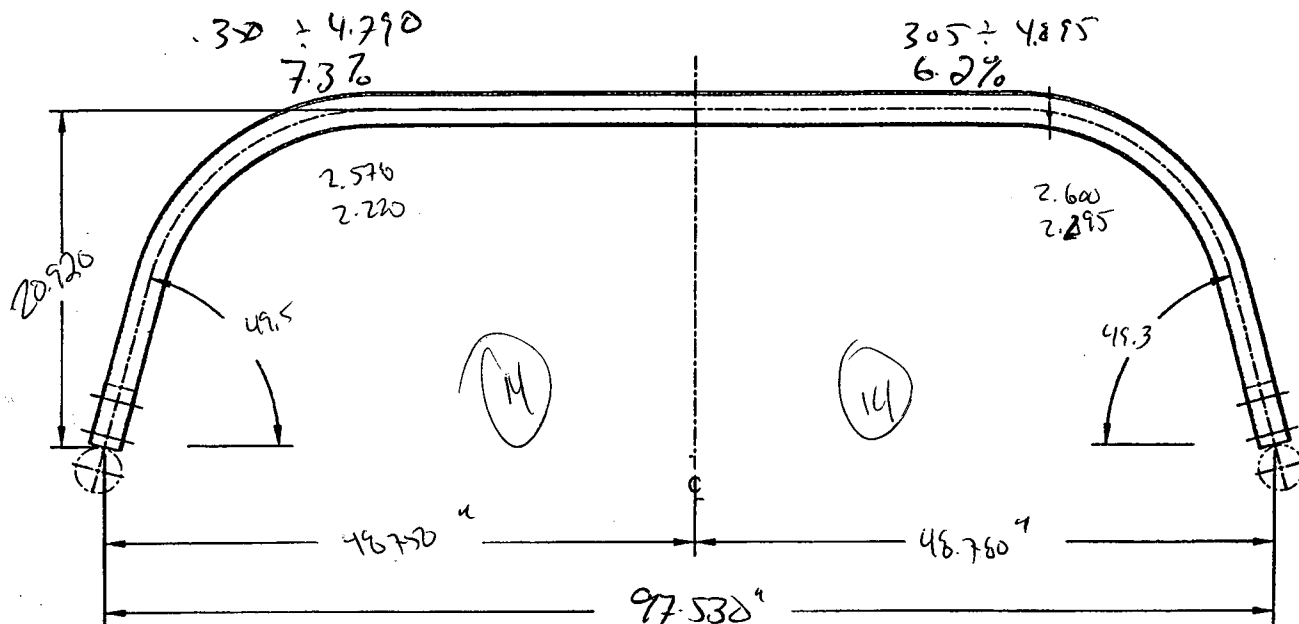
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

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<b>DART AEROSPACE LTD</b>	<b>Work Order:</b>	74976
<b>Description:</b> Crosstube Low Fwd (205/212/412)	<b>Part Number:</b>	D212-664-107
<b>Inspection Dwg:</b> D212-664-147 <b>Rev:</b> B		<b>Page 1 of 1</b>

Required Dimension	Min	Max
Height	20.79	21.05
1/2 Span	48.55	48.81
Angle	49	52
Total Span	97.1	97.62



Size	Comments
Size A = 7.37	(@ 14 Passes)
Size B = 6.27	(@ 14 Passes)
(see note 10)	

QC15 Inspection	8
Date	11/01/2

Rev	Date	Change	Revised by	Approved
A	08.02.29	New Issue	KJ/JM	
B	10.01.21	Dwg Rev updated	KJ	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Item	Qty -147	Qty -147B	Part Number	Description
1	X		D212-664-147	CROSSTUBE ASSEMBLY (205/212/412 LOW FWD)
2		X	D212-664-147B	CROSSTUBE ASSEMBLY (214 LOW FWD)
3	1	1	D6019-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	2	2	D3659-1	CUFF
7	4	4	MS21920-25	CLAMP (OR MS21920-26)
8	44	44	CR3212-4-06	RIVET (OR M7885/3-4-06)
9	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
10	A/R	A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

# GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6019-128  
FINISHED LENGTH = 126.528±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF  
USING VIBRATING STYLUS.
- 7) WEIGHT: D212-664-147 = 24.2 lbs (PER IIN-D212-664)  
D212-664-147B = 24.2 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE
- 9) WHEN MACHINING TAPER, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD  
BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6%  
BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038
- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF  
D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER  
INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1  
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE  
SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS.  
DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE  
UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS  
NOT BOTTOMED-OUT AFTER TORQUING.
- 16) INSTALL D3659-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF  
SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE.  
SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 17) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER

NO. 74976  
M.C.J  
111

DEO ATTACHED

Per ECD#1164  
1107-28  
UNDER REVIEW  
11/10/13

RELEASED  
2009-10-29

B	REVISE GENERAL NOTES/PART LIST; UPDATE TO CURRENT STANDARDS; ADD -147B (ZN C4-2, D4-2)	RF	09.09.30
A	NEW ISSUE	CP	07.07.07
REV.	DESCRIPTION	BY	DATE
DESIGN	RF	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF	DRAWING NO.	REV. B
CHECKED	RF	D212-664-147	SHEET 1 OF 4
MFG. APPR.	RF	TITLE	SCALE
APPROVED	RF	CROSSTUBE (205/212/412 LOW FWD)	NTS
DE APPR.	RF	COPYRIGHT © 2007 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COMMERCE OR COMMUNICATIONS TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	
DATE	09.09.30		

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

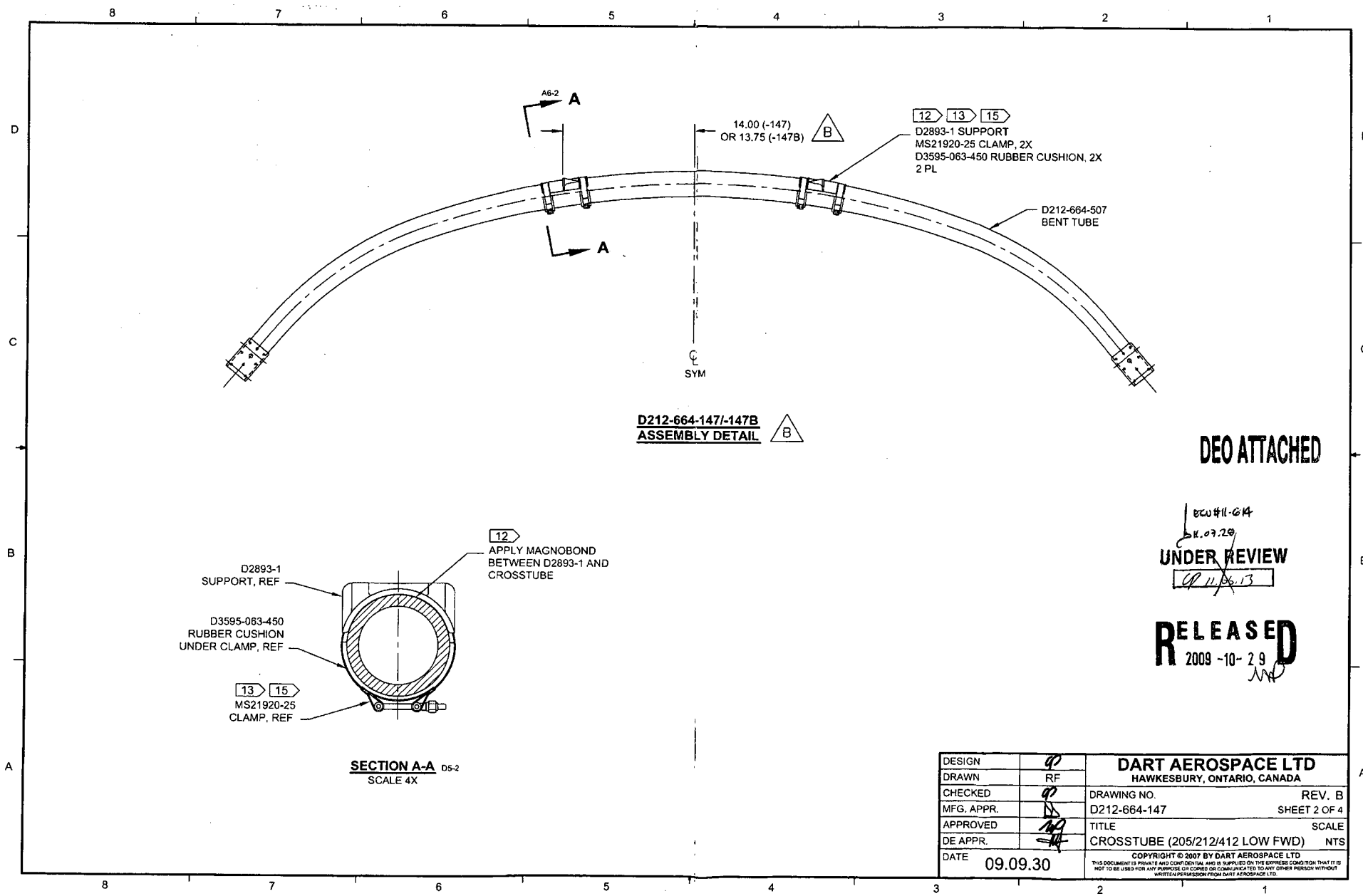
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

74976



DEO ATTACHED

ECU #11-614  
K. 07.20  
UNDER REVIEW  
11.06.13

RELEASED  
2009-10-29

DESIGN	RF	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF	DRAWING NO.	REV. B
CHECKED	RF	D212-664-147	SHEET 2 OF 4
MFG. APPR.	RF	TITLE	SCALE
APPROVED	RF	CROSSTUBE (205/212/412 LOW FWD)	NTS
DE APPR.	RF	COPYRIGHT © 2007 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	
DATE	09.09.30		

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

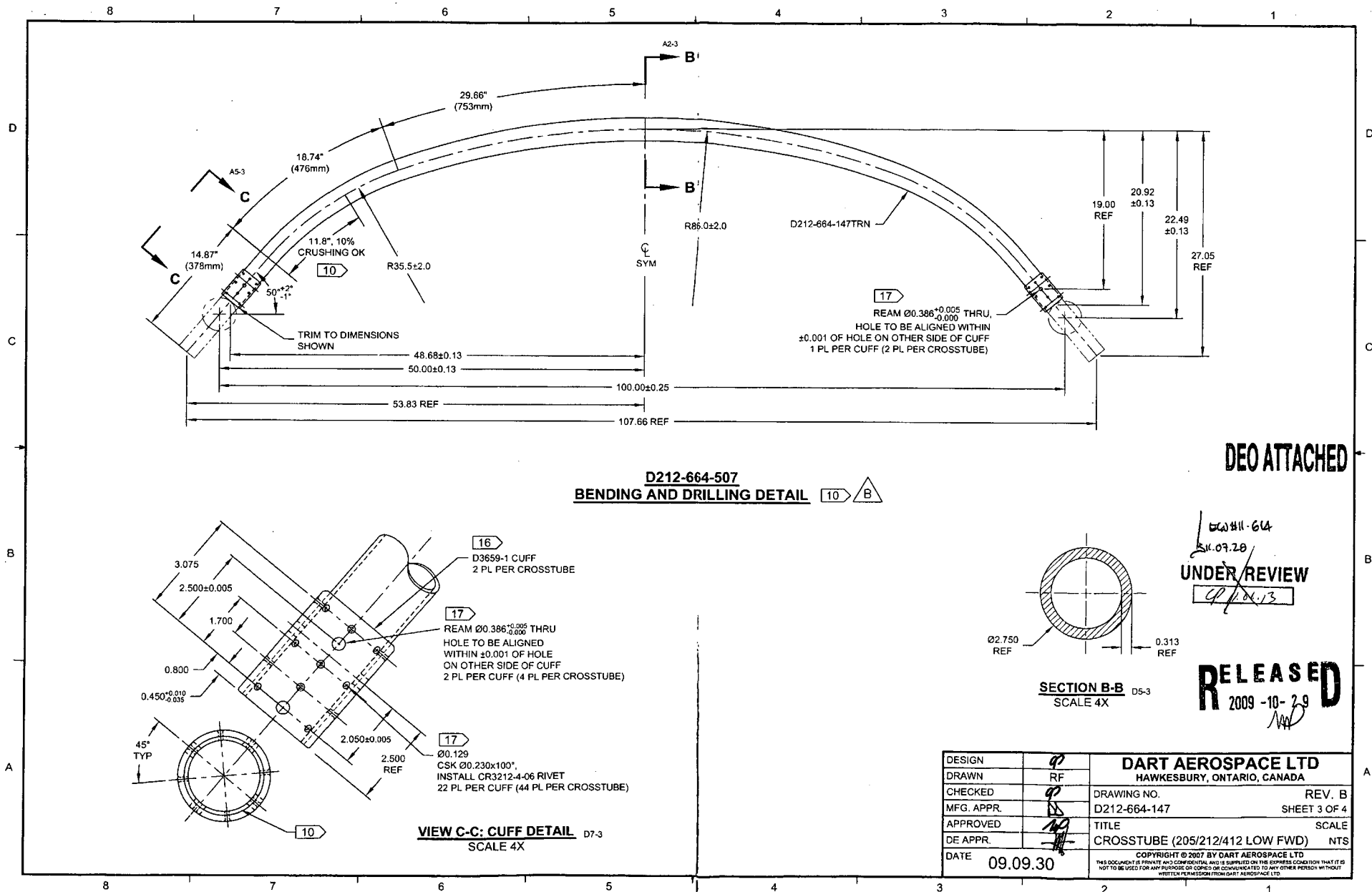
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

74976



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

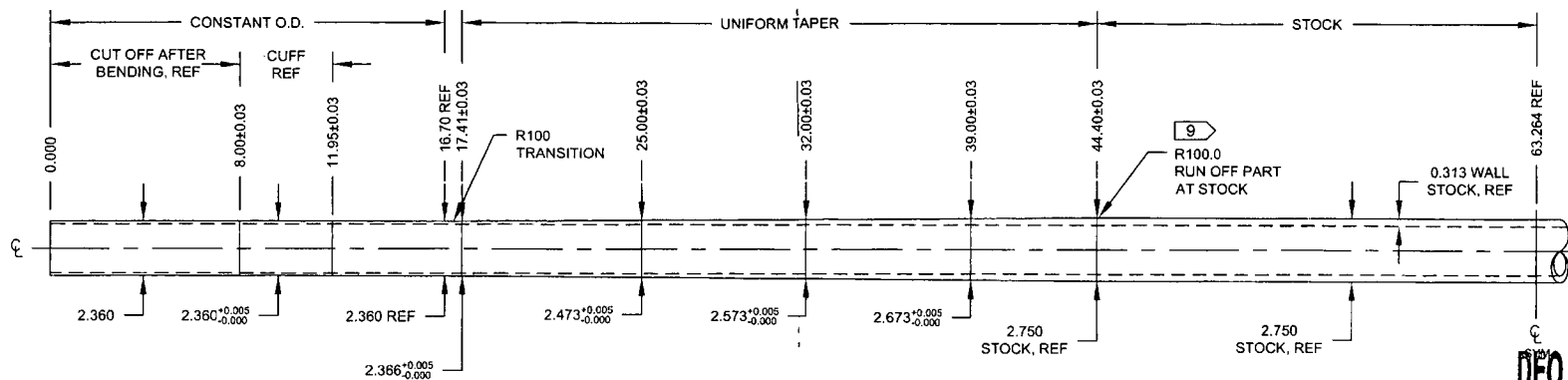
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



74976



**D212-664-147TRN  
TURNING DETAIL**

**DEO ATTACHED**

ECO #1-614  
11.07.26  
**UNDER REVIEW**  
R. 11/26/13

**RELEASED**  
2009-10-29

DESIGN	Q	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	Q	DRAWING NO.	REV. B
MFG. APPR.	SS	D212-664-147	SHEET 4 OF 4
APPROVED	AP	TITLE	SCALE
DE APPR.	AP	CROSSTUBE (205/212/412 LOW FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2007 BY DART AEROSPACE LTD	
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

74976

DRAWING NO. D212-664-147	TITLE CROSSTUBE ASS'Y (205 LOW FWD)	REV. B	<b>DART AEROSPACE LTD ENGINEERING ORDER</b>		D.E.O. NO. D212-664-147-B-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>92</i>	CHECKED <i>ASS</i>	MFG. APPR. <i>183</i>	APPROVED <i>WJ</i>		DE APPR. <i>H</i>		
DATE 11.07.15	DATE 11.07.20	DATE 11.07.21	DATE 11/07/21		DATE 11.07.21		

**PURPOSE:**

REPLACE MAGNOBOND WITH PROSEAL.

**CHANGE:**

IS:

Item	Qty -147	Qty -147B	Part Number	Description
9	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

9	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
---	-----	-----	----------------	---

NOTE 12 &amp; 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) TO INSTALL D2893-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.**

WAS:

- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

**RELEASED**  
2011-07-28  
*WJ*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



# RAPPORT D'ESSAI NON DESTRUCTIF

(SUITE)

RAPPORT #

7-11198

PAGE 2 DE 2.

CLIENT DART Aerospace DATE 27 octobre 2011 HEURE ☒ AM ☐ PM  
ATTENTION Mme Linda Lavelle NO. TRAVAIL ACUREN 188-11-02376  
RÉSULTATS (☐ METRIQUE ☐ IMPÉRIAL)

Work	Order	ID	Crosstube	Item	ID	Data
		74992				D 212-664-107
"	"	74991	"	"	"	D 212-664-207
"	"	75277	"	"	"	D 212-664-207
"	"	754990	"	"	"	D 212-664-207
"	"	75314	"	"	"	D 212-664-107
"	"	75313	"	"	"	D 212-664-107
"	"	74976	"	"	"	D 212-664-107
"	"	72743	"	"	"	D 407-667-205
"	"	72742	"	"	"	D 407-667-205
"	"	75310	"	"	"	D 212-664-107
"	"	75540	"	"	"	D 212-664-207
"	"	75542	"	"	"	D 212-664-207

All the crosstubes (12) Accepted  
No indication as found.

RT 11-10-28

## Étendue des Services

L'entente selon laquelle le Groupe Acuren Inc. exécute les services ne concerne que les énoncés par écrit. En aucune circonstance ces services ne s'étendent au-delà de l'exécution des services demandés. Il est entendu que toutes les descriptions, les observations et les expressions d'opinions faites par Acuren reflètent les opinions ou les observations de l'entreprise fondées sur l'information et les hypothèses fournies par le propriétaire/opérateur, et elles ne constituent pas des déclarations ou des garanties ou ne peuvent être interprétées comme constituant. Le Groupe Acuren Inc. n'assume aucune des responsabilités du propriétaire/opérateur, et le propriétaire/opérateur conserve la responsabilité entière des décisions prises en matière d'ingénierie, de fabrication, de réparation et d'usage à partir de l'information ou des données fournies par Acuren en rapport avec les services décrits dans les présentes ne peuvent excéder le coût des services rendus.

## Norme de Diligence

Dans l'exécution des services, le Groupe Acuren Inc. applique le degré de diligence, le soin et la compétence normalement exercés dans des circonstances semblables par d'autres fournisseurs de ce type de services opérant dans la même localité ou dans une localité similaire. Aucune autre garantie, implicite ou explicite, n'est faite ou voulue par le Groupe Acuren Inc.

## SIGNATURES

REPRÉSENTANT  
À LA CLIENTÈLE

TECHNICIEN (SIGNATURE)

NAME (MOULÉE):

NIVEAU CGSB

No. ENREG. CGSB

NIVEAU SNT

No. ENREG. CGSB

NIVEAU CGSB

No. ENREG. CGSB

NIVEAU SNT

No. ENREG. CGSB

FTJ #:

RAPPORT  
REVISÉ PAR:

NOM

INITIALES



**ACUREN****RAPPORT D'INSPECTION PAR RESSUAGE**

P - 11198

PAGE 1 DE 2

CLIENT

ATTENTION

ADRESSE

PROJET

ITEM(S) EXAMINÉ

DATE

N° TRAVAIL  
ACUREN

N° CLIENT POWO

SITE DE TRAVAIL

ACCEPTATION STD. 1417/QST 038 DATE/RÉV. 2005

27 octobre 2011

HEURE

AM ☐ PM ☐

Dant Aerospace

Mme Linda Lucelle

1276 Aberdeen St, Hawkes-

bury, Ont, K6A 1K7

Cross tubes inspection (Fluorescent Penetrant)

12 x Cross tubes

188-11-02376

152871

Dant Usine

1417/QST 038

2005

DESCRIPTION DES TRAVAUX	N° PROCÉDURE	LT-002	DATE/RÉV.	2007	N° TECHNIQUE	LT-002	DATE/RÉV.	2007
N° ITEMS	See on bottom				MATÉRIEL	Aluminium		
DESCRIPTION	Inspection 100% (Penetrant Fluorescent) on surface external on 12 cross tubes				ÉPAISSEUR	Union		

DÉTAILS DES INSPECTIONS																	
MÉTHODE :		<input checked="" type="checkbox"/> FLUORESCENT		<input type="checkbox"/> VISIBLE		<input checked="" type="checkbox"/> LAVABLE À L'EAU		<input type="checkbox"/> MÉTHODE DISSOLVANT		<input type="checkbox"/> PRÉ-ÉMULSIONNANT							
MARQUE :		Magnaflux				LUM. NOIRE S/N		164405		<input checked="" type="checkbox"/> PUISS. > 1000 µ W/cm²		<input type="checkbox"/> AMBIANT < 2 fc					
PÉNÉTRANT :		Zyglo ZLC7		TEMPS PÉNÉTRATION MIN.		10		MIN.		ÉQUIP. LUMIÈRE		<input type="checkbox"/> LAMP. POCHE		<input type="checkbox"/> LAMP. CULASSE		<input type="checkbox"/> PUISS. > 100 fc @ SURFACE	
DISSOLVANT PÉNÉTRANT		H2O		TEMPS SÉCHAGE MIN.		> 10		MIN.		AUTRES		Modèle LABINO					
RÉVÉLATEUR		SKD-52		TEMPS PÉNÉTRATION MIN.		10		MIN.		MÈTRE LUM. N/S		DATE CAL DUE					
TYPE RÉVÉLATEUR		<input checked="" type="checkbox"/> NON AQUEUX		<input type="checkbox"/> AQUEUX		<input type="checkbox"/> SEC											

SURFACE INSPECTÉE					
CONDITION SURFACE	<input type="checkbox"/> MEULÉE	<input type="checkbox"/> SOUDÉE	<input type="checkbox"/> MACHINÉE	<input type="checkbox"/> GRENAILLÉE	<input checked="" type="checkbox"/> MÉTAL PROPRE
TEMPÉRATURE SURFACE	<input type="checkbox"/> < - 4°C/ 20°F	<input type="checkbox"/> - 4°C/ 20°F DE 10°C/50°F	<input checked="" type="checkbox"/> 10°C/50°F DE 52°C/125°F	<input type="checkbox"/> > 52°C/125°F	

RÉSULTATS-	<input type="checkbox"/> MÉTRIQUE	<input type="checkbox"/> IMPÉRIAL
------------	-----------------------------------	-----------------------------------

ITEM	COMMENTS
See other sheet for results	
11-10-28	

**Étendue des Services**  
L'entente selon laquelle le Groupe Acuren Inc. exécute les services ne concerne que les énoncés par écrit. En aucune circonstance ces services ne s'étendent au-delà de l'exécution des services demandés. Il est entendu que toutes les descriptions, les observations et les expressions d'opinions faites par Acuren reflètent les opinions ou les observations de l'entreprise fondées sur l'information et les hypothèses fournies par le propriétaire/opérateur, et elles ne constituent pas des déclarations ou des garanties ou ne peuvent être interprétées comme constituant. Le Groupe Acuren Inc. n'assume aucune des responsabilités du propriétaire/opérateur, et le propriétaire/opérateur conserve la responsabilité entière des décisions prises en matière d'ingénierie, de fabrication, de réparation et d'usage à partir de l'information ou des données fournies par Acuren en rapport avec les services décrits dans les présentes ne peuvent excéder le coût des services rendus.

**Norme de Diligence**  
Dans l'exécution des services, le Groupe Acuren Inc. applique le degré de diligence, le soin et la compétence normalement exercés dans des circonstances semblables par d'autres fournisseurs de ce type de services opérant dans la même localité ou dans une localité similaire. Aucune autre garantie, implicite ou explicite, n'est faite ou voulue par le Groupe Acuren Inc.

SIGNATURES			
REPRÉSENTANT	Matt Murdoch	FTJ #	
TECHNICIEN (SIGNATURE)	Therese Luc Delon	RAPPORT RÉVISÉ PAR:	
NOM (MOULÉ):	1 <sup>ER</sup> TECHNICIEN	NOM	INITIALES
ONGC NIVEAU 2	SNT NIVEAU 2	ONGC NIVEAU	SNT NIVEAU
ONGC N° REG. 12205	ONGC N° REG.		

BLANCHE - COPIE DU CLIENT

JAUNE - COPIE DU BUREAU

ROSE - COPIE DU TECHNICIEN

OR - COPIE DU BUREAU

PT Décembre 2005





## 5.2 STANDARD GEAR CROSSTUBES

Item	-107	-207	-209	Part Number	Description
	X			D212-664-107	CROSSTUBE INSTALLATION, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD FWD
		X		D212-664-207	CROSSTUBE INSTALLATION, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD AFT
			X	D412-664-209	CROSSTUBE INSTALLATION, 412 STANDARD AFT
6	1			D212-664-147	CROSSTUBE ASSEMBLY, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD FWD
7		1		D212-664-247	CROSSTUBE ASSEMBLY, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD AFT
8			1	D412-664-249	CROSSTUBE ASSEMBLY, 412 STANDARD AFT
10	2			* D2893-1	SUPPORT
11	4			* D3595-063-450	RUBBER CUSHION
12	4			* MS21920-25	CLAMP (OR MS21042-26)
13	4			AN6-35A	BOLT
14	4			AN6-36A	BOLT
15	6			MS21042L6	NUT (OR MS21042-6)
16	18			AN960JD616	WASHER
20		2		* D2940-1	SUPPORT
21		4		* D3595-063-530	RUBBER CUSHION
22		4		* MS21920-28	CLAMP (OR MS21042-30)
23		4		AN6-40A	BOLT
24		2		AN6-41A	BOLT
25		6		MS21042L6	NUT (OR MS21042-6)
26		18		AN960JD616	WASHER
30			1	* D2896-1	SUPPORT
32			2	* D3595-063-570	RUBBER CUSHION
33			4	* MS21920-28	CLAMP
34			2	* MS21920-30	CLAMP (OR MS21042-32)
35			4	AN6-40A	BOLT
36			2	AN6-41A	BOLT
37			6	MS21042L6	NUT (OR MS21042-6)
38			18	AN960JD616	WASHER
39			2	* D3189-1	CHAFING SHIELD
45	2			* D3659-1	CUFF
46		2	2	* D3660-1	CUFF
47	44	44		* CR3212-4-06	RIVET (M7885/3-4-06)
48			44	* CR3212-4-07	RIVET (M7885/3-4-07)
50	1	1		D3428-1	PLACARD

\*REFERENCE ONLY. PARTS ARE INCLUDED IN D212-664-147/-247 OR D412-664-249 ASSEMBLIES ABOVE  
 NOTE: KITS INCLUDE EXTRA HARDWARE FOR COMPATIBILITY WITH BOTH DART AND BELL/AAI  
 SKIDTUBES.

